How does binding or removing metal ions in wine affect the volatile sulfur compounds?

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INTRODUCTION
- Volatile sulfur compounds (VSCs) with aromas described as ‘rotten egg’, ‘sewage’ and ‘rubber’ greatly reduce wine quality.
- Metals play a significant role in the redox cycles in wine that control the production and release of these VSCs.
- Removal of metals from wine is therefore of interest as a way to control VSCs.
- Of the fining methods available to winemakers, few are effective in removing only metal ions, which means their use may result in a wine more stable to oxidation and reduction, but also with lower quality.
- An alternative is to ‘lock’ the metal ions up without removing them by using naturally occurring compounds that bind to the metal ions (chelators).
- The aim of this project was to assess the ability of a range of chelators to bind metals in wine and prevent their involvement in the reactions that form VSCs.

METHODOLOGY
WINE
- Chardonnay (CHA) from 2014 and Shiraz (SHZ) from 2013.

TREATMENT
- Copper (Cu) and iron (Fe) content were increased to 0.5 mg/L and 3.0 mg/L respectively, prior to the experiment.
- Each wine was treated with either phytic acid (PA), ethylenediaminetetraacetic acid (EDTA) or a commercially available tannin (TI Premium). Metal content and VSCs were monitored over 12 months.

BOTTLING
- Wine was filtered (0.45 μm) and bottled into 375 mL clear glass bottles under screwcap.

RESULTS
- After 12 months in bottle, both the CHA and SHZ treated with the polyphenol extract had a significantly lower H₂S content than the control.
- EDTA also showed a significantly lower H₂S concentration than the control, whilst phytic acid had no effect.

CONCLUSION
It is possible to change the VSC content of wine by limiting the impact metals have on the wine chemistry.